REMARKS

Examiner's Rejections and Objections

The foregoing Amendment and remarks which follow are responsive to the final office action mailed August 12, 2002 ("Office Action"). In that Office Action, the Examiner rejected Claims 1, 3-6, and 8-9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 5,986,785 issued to Kobayashi ("Kobayashi") in view of U.S. Pat. No. 5,349,461 issued to Huynh et al. ("Huynh"). The Examiner further rejected Claims 2 and 7 under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi in view of Huynh in further view of U.S. Pat. No. 6,335,812 issued to Matsubara et al. ("Matsubara").

Applicants' Response

I. 35 U.S.C. § 103(a)

In Applicant's view, neither the Kobayashi nor Huynh references disclose first and second modules each having a single hardwired electrical conductor signal path connecting the first and second modules as claimed in amended independent Claims 1 and 6. In Applicant's view, the Kobayashi and Huynh references appear to generally disclose optical communication devices and various structures for conducting optical communications between such structures. As will be discussed in further detail below,

Applicant respectfully submits that such optical communication devices disclosed by Kobayashi and Huynh are distinguishable from the present invention.

A. *The Present Invention*

The present invention overcomes several deficiencies in the prior art by providing a shock-resistant system which interconnects first and second modules within a computer system. In particular, the present invention is designed to adapt existing optical communication systems found in hostile environments to mitigate occurrence of data loss, disconnection between modules, and disruptions of other electronic components when servicing. Optical communications systems found in hostile environments may be subject to shock, smoke, obstacles, and other hazards which may ultimately disrupt communications between the modules or cause malfunctions in other electronic components relying upon such modules. Optical transceivers are generally dependent upon line-of-sight between transmitters and receivers for effective communications to occur. Such harsh conditions may generally impede communications between the modules. Additionally, it is generally difficult to service such modules without major disruption in such hostile environments since optical photodiodes and LEDs are generally permanently soldered into modules.

To overcome such disadvantages, the present invention provides first and second modules having first and second respective media access control logic circuits formed thereon. Applicant has amended independent Claims 1 and 6 to clarify such novel features and to additionally emphasize a single hardwired electrical conductor signal path connecting said first and second modules to facilitate electrical bi-directional communications between said first and second media access control logic circuit only through said hardwired electrical conductor signal path. Applicant submits that such amendments do not constitute new matter and such support may be found in the specification fo the Application at page lines 7-14 and throughout. Additionally, a standardized infrared communications scheme protocol is implemented to advantageously provide data collision detection along the path. Thus, transmission of data may be retried along the single hardwired electrical conductor signal path where such collision is detected. While the single hardwired electrical conductor signal path allows for data to be transmitted between the first and second modules, the path is not wireless or optical as much of the prior art cited by the Examiner appears to utilize. In Applicant's view, such optical communications systems are generally limited by line-of-sight required between optical transceivers.

Additionally, while the present invention implements first and

second media access control logic circuits, no photodiode receivers, LED transmitters, or other optical transmitting and receiving devices are incorporated into the modules. Instead, the media access control logic circuits which are capable of transmitting and receiving data via a standardized infrared communications scheme protocol are integrated while eliminating any dependency upon limitations imposed by optical transceivers. Advantageously, such media access control logic circuits provide for retransmission of data where a data collision is detected. Simply put, the present invention overcomes such disadvantages presented by optical transceivers while taking advantage of the data collision detection and management from infrared communications scheme protocols and comparatively reducing total power consumption eliminating the use of high power conventional optical transceivers.

B. The Kobayashi Reference

In the Office Action, the Examiner stated that it would have been obvious to combine the transceiver modules in Huynh with the optical communications system of Kobayashi to provide "digital optical data transmission to increase the transmission speed and transmission capacity of the system." Office Action, p.3 (emphasis added). Applicant respectfully submits that the present invention

does not conduct any "optical data transmission" as stated by the Examiner. As such, Applicant believes the Kobayashi reference to be distinguishable from the present invention in several aspects. In particular, the Kobayashi reference does not appear to disclose a single hardwired electrical conductor signal path connecting said first and second modules to facilitate electrical bi-directional communications between said first and second media access control logic circuits only through said hardwired electrical conductor signal path, or implementation of a standardized infrared communications scheme protocol in conjunction with the foregoing elements.

The Examiner contends that the "path that connects module 24 to module 25)" shown in Fig. 3 of Kobayashi is comparable to the path of the present invention. Office Action, p.3. However, Applicant respectfully submits that Kobayashi fails to disclose the single hardwired electrical conductor signal path as cited in amended independent Claims 1 and 6. As previously discussed, the Kobayashi appears to communicate optically through infrared beams while the present invention does so electrically through the path. As understood by Applicant, Fig. 3 of Kobayashi appears to depict a schematic block diagram. The description of optical transceivers 24 and 25 with respect to such Fig. 3 do not appear to discuss the nature of the connection in specific detail. In fact, the fact

that the modules are described as "an infrared beam transceiver, and an infrared beam emitting/receiving device 25" appears to suggest that the path formed between the optical transceivers 24 and 25 is indeed an optical wireless connection which does not utilize any hardwired electrical connections. Even further, in Applicant's view, nothing in Kobayashi discloses or suggests that a hardwired electrical connection could be formed between the optical transceivers 24 and 25.

In Applicant's view, the single hardwired electrical conductor signal path of the present invention overcomes disadvantages of optical communication such as those disclosed in the Kobayashi reference. In particular, the path does not require a line-of-sight as is typically required by optical transceivers. In addition, optical transceivers generally require a great deal of power which tends to increase as the distance between the optical transceivers lengthens. By providing a single hardwired electrical conductor signal path, there is a decreased level of power consumption for such electrical communication as compared to the relatively high power consumption required by optical transceivers. Additionally, while providing a single hardwired electrical conductor signal path provides an independent advantage over the existing optical transceiver-based systems, the coupling of such a path with the standardized infrared communications scheme

protocol provides enhanced data communications management which might otherwise be unavailable unless optical transceiver-based systems were utilized.

There, Applicant believes that the Kobayashi is distinguishable from the present invention in failing to disclose a single hardwired electrical conductor signal path connecting said first and second modules to facilitate electrical bi-directional communications between said first and second media access control logic circuits only through said hardwired electrical conductor signal path, or the use of a standardized infrared communications scheme protocol implemented in conjunction therewith.

C. The Huynh Reference

Referencing the Huynh reference, Applicant believes that the Huynh reference also fails to disclose a single hardwired electrical conductor signal path connecting said first and second modules to facilitate electrical bi-directional communications between said first and second media access control logic circuits only through said hardwired electrical conductor signal path, or implementation of a standardized infrared communications scheme protocol in conjunction with the foregoing elements.

As understood by the Applicant, Huynh transmits data "on an optical waveguide, which operates on one light frequency only."

Huynh, col. 2, lns. 4-8. Thus, Huynh also appears to conduct optical communications. Huynh states that "electrical signals are fed, on one had, to an optical transmitter 23, performing an electro-optical transformation of the signals, and simultaneously, the transmission signal is fed to the pulse width correction unit 18." Huynh, col. 4, lns. 37-41 (emphasis added). In Applicant's view, optical data is thus transmitted from an optical transmitter to an optical receiver while the receiver receives the optical data and converts this to an electrical signal. The intermediary connection which the Examiner purports as being analogous to the path in the present invention appears to be in fact an optical connection formed along the "optical waveguide 3."

By contrast, the present invention does not include any "optical transmitter," "optical receiver," or intermediary "optical waveguide" since, as stated in Claims 1 and 6, a single hardwired electrical conductor signal path is formed between the first and second modules of the present invention. Bi-directional communications conducted across the path are electrical in nature and not optical as it appears to be in Huynh.

Additionally, while the Examiner contends that Huynh transmits data "substantially conforming to a standardized infrared communications scheme protocol (col. 3, lines 25-36)," Applicant believes Huynh discloses a proprietary communication protocol.

Office Action, p. 3. Applicant submits that the mere inclusion of optical transmitters and receivers does not indicate that data is communicated using a standardized infrared communications scheme protocol. As described in Huynh, it appears that various pulse modifying devices are placed into communication with the optical transmitters and receivers to generally modify the signal distribution and width of pulses for allowing the signal to be transmitted across the optical waveguide. Due to such modification and specified medium, Applicant believes there is nothing to suggest that data is being communicated via a standardized infrared communications scheme protocol as claimed in the present invention.

II. Request for Allowance

Applicant submits that Claims 2-5 further define novel details of the invention as cited in independent Claims 1 while Claims and 7-9 further define novel details of the invention as cited in independent Claim 6. On the basis of the foregoing, Applicant submits that the stated grounds of rejection have been overcome, and that such claims are in now condition for allowance. An early Notice of Allowance is therefore respectfully submitted.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes

made".

Should the Examiner have any suggestions for expediting allowance of the application, the Examiner is invited to contact Applicant's representative at the telephone number listed below. If a fee is required, please charge Account Number 14-1325.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the following Claims:

1. (Twice Amended) A shock-resistant system for operatively interconnecting modules within a computer system to enable data to be transmitted and received therebetween comprising:

a. a first module having a first media access control logic circuit formed thereon for transmitting and receiving data ~~at least one tri-stateable digital transmitter element formed thereon for transmitting data from said first module, said first module having at least one digital receiver element formed thereon for receiving data for said first module, said data transmitted and received by said first module~~ substantially conforming to a standardized infrared communications scheme protocol;

b. a second module having a second media access control logic circuit formed thereon for transmitting and receiving data ~~at least one tri-stateable digital transmitter element formed thereon for transmitting data from said second module, said second module having at least one digital receiver element formed thereon for receiving data for said second module, said data transmitted and received by said second module~~ substantially conforming to said standardized infrared

communications scheme protocol utilized by said first module; and

c. a single hardwired electrical conductor signal path connecting said first and second modules to facilitate electrical bi-directional communications between said first and second media access control logic circuits only through said hardwired electrical conductor signal path. ~~therebetween.~~

6. (Twice Amended) A method for operatively interconnecting modules within a computer to enable data to be transmitted and received therebetween comprising:

a. providing a first module having a first media access control logic circuit formed thereon for transmitting and receiving data ~~at least one transmitter element and at least one receiver element formed thereon, said data transmitted and received by said first module~~ substantially conforming to a standardized infrared communications scheme protocol;

b. providing a second module having a second media access control logic circuit formed thereon for transmitting and receiving data ~~at least one transmitter element and at least one receiver element formed thereon, said data transmitted and received by said second module~~ substantially conforming to a standardized infrared communications scheme protocol; ~~and~~

c. forming a single hardwired electrical conductor signal path solely connecting the first and second media access control logic circuits; and

d.~~c.~~ communicating electrically between the first and second modules ~~via~~ only through said single hardwired electrical conductor signal path bi-directionally ~~a single bi-directional communication path~~ using the standardized infrared communications scheme protocol.

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